

IN THE CLAIMS

19. (Previously Presented) A method of delivering a fluid to tissue of a patient, comprising:
providing a pressurized fluid source;
providing an injection catheter comprising
a shaft having a proximal region, a distal region and an infusion lumen extending therethrough,
the distal region of the catheter including a nozzle and an injection port,
the proximal region of the catheter fluidly coupled to the pressurized fluid source;
inserting the injection catheter into the patient;
navigating the injection catheter until the distal region is positioned adjacent to an injection site;
generating a high transient pressure in the fluid at the pressurized fluid source,
the high transient pressure sufficient to pierce bodily tissue; and
injecting the pressurized fluid into the tissue of the patient by causing the pressurized fluid to pass through the infusion lumen and the injection port.
20. (Previously Presented) The method of claim 19 wherein the smallest cross-sectional area of the injection port is at least one-third of the cross-sectional area of the infusion lumen when measured at the beginning of the transition from the infusion lumen to the nozzle.
21. (Previously Presented) The method of claim 19 wherein the transient pressure of the fluid within the lumen is sufficient to pierce tissue prior to the fluid passing through the injection port.
22. (Previously Presented) The method of claim 19 wherein the injection port is defined by surfaces of the infusion lumen.
23. (Original) The method of claim 19 wherein the high transient pressure reaches at least 5000 psi in less than about one second.
24. (Original) The method of claim 19 wherein the high transient pressure peaks between around 4000 psi and around 7000 psi.
25. (Original) The method of claim 19 further comprising regulating a fluid flow through the catheter.

26. (Previously Presented) The method of claim 25 wherein the regulating step includes drawing a vacuum force through the catheter.
27. (Original) The method of claim 19 further comprising regulating a volume of the fluid injected through the injection port.
28. (Previously Presented) The method of claim 19 further comprising stabilizing the distal region of the catheter adjacent to the injection site by creating a fluid seal between the tissue and the distal region of the catheter.
29. **(Currently Amended)** A method of delivering a fluid to tissue of a patient, comprising:
providing an injection catheter comprising
a shaft having a proximal region, a distal region and an infusion lumen extending therethrough,
the distal region of the catheter including a nozzle and an injection port;
inserting the injection catheter into the patient;
navigating the injection catheter until the distal region is positioned adjacent to an injection site;
penetrating a surface of the tissue with the injection port; and
forcing fluid out of the injection port and into the penetrated tissue, the fluid forced into the tissue being under a pressure sufficient to pierce the tissue.
30. (Previously Presented) A catheter for delivering fluid to tissue of a patient, comprising:
an injection catheter comprising a shaft having a proximal region, a distal region and an infusion lumen extending therethrough;
a high pressure source in fluid communication with the infusion lumen, the high pressure source adapted to generate a high transient pressure in fluid exiting the high pressure source, the pressure of the exiting fluid being sufficient to pierce bodily tissue; and
an injection port at the distal region of the injection catheter in fluid communication with the infusion lumen.
31. (Original) The catheter of claim 30 further comprising an outer sheath coaxially disposed around the shaft wherein an annular lumen is formed between an inner surface of the outer sheath and an outer surface of the shaft.
32. (Previously Presented) The catheter of claim 31 further comprising a vacuum source in fluid communication with said annular lumen wherein when the distal end of the injection

catheter is placed in contact with the tissue and a vacuum is applied to the annular lumen, the distal end of the injection catheter is stabilized against the tissue.

33. (Original) The catheter of claim 30 wherein the means for generating high transient pressure in the fluid comprises a syringe containing the fluid.

34. (Previously Presented) The catheter of claim 31 further comprising a vacuum source in fluid communication with the annular lumen.

35. (Previously Presented) The catheter of claim 33, wherein the syringe is actuated pneumatically.

36. (Previously Presented) The catheter of claim 30, wherein the means for generating high transient pressure in the fluid is an automated high pressure injection system.

37. (Original) The catheter of claim 30 wherein the means for generating a high transient pressure in a fluid is a transdermal injection device.

38. (Previously Presented) A method of delivering a liquid to target tissue at a target site of a patient, comprising:

penetrating the surface of target tissue by urging a piercing end of a medical device into the target tissue, the medical device having a lumen in fluid communication with a source of the liquid; and

piercing tissue at the target site by forcing liquid out of the piercing end of the medical device after the medical device has penetrated the surface of the target tissue, the liquid exiting the medical device having a transient pressure sufficient to pierce tissue at the target site.

39. (Previously Presented) The method of claim 38 wherein the piercing end of the medical device terminates in a pointed ridge.

40. (Previously Presented) The method of claim 38 wherein the piercing end of the medical device defines orifices opening in a direction orthogonal to the lumen in the medical device.

41. (Previously Presented) A method of delivering a liquid to a target tissue comprising:
placing the distal region of a catheter at a target tissue site;
activating a vacuum force to urge the distal region of the catheter towards the target tissue and to temporarily stabilize the distal region of the catheter at the target tissue; and
ejecting liquid from the catheter under such pressure that the liquid pierces the target tissue.

42. (Previously Presented) The method of claim 41 wherein the catheter contains a first lumen and a second lumen, the first lumen transmitting a vacuum force to the distal region of the catheter and the second lumen transmitting the liquid to the distal region of the catheter.

43. (Previously Presented) The method of claim 42 wherein the first lumen of the catheter is enlarged at its distal region.

44. (Previously Presented) A medical device for delivering high pressure fluids to a target site, the medical device comprising:

a lumen ending in a distal end; and

a pressure source in fluid communication with the lumen, the pressure source adapted to place liquid in the lumen under a high transient pressure sufficient to pierce tissue, the distal end of the lumen having a reduced cross-sectional area when compared with the average cross-sectional area of the lumen.

45. (Previously Presented) A medical device for delivering high pressure fluids to a target site, the medical device comprising:

a lumen ending in a distal end; and

a pressure source in fluid communication with the lumen, the pressure source adapted to place liquid in the lumen under a high transient pressure sufficient to pierce tissue, the distal end of the lumen having an enlarged cross-sectional area when compared with the average cross-sectional area of the lumen.